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## Preventive Medicine Reports

journal homepage: <http://ees.elsevier.com/pmedr>

## Brief Original Report

## Decreases in tanning behaviors following a short online survey: Potential for prevention?

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## ARTICLE INFO

Available online 24 January 2015

## Keywords:

Tanning  
Students  
Prevention

## ABSTRACT

**Objectives.** To date, tanning prevention programs have led to limited success. The aim of the present study was to investigate potential unexpected prevention effects of completing an online survey focused on tanning attitudes, behaviors, and knowledge among female college tanners.

**Methods.** A sample of 92 female undergraduate students from the USA, mean age = 20.09, SD = 1.41 years, who engaged in indoor tanning completed an online survey assessing awareness of tanning-related health risks, appearance-based motivations to tan and not to tan, media literacy related to tanning marketing, and tanning behaviors in 2013. Four months later, participants were invited to complete a follow-up survey assessing tanning intentions and behaviors since completing the initial survey.

**Results.** Fifty-one participants (55%) completed the follow-up questions, of whom 43 (84.3%) reported having decreased or ceased engaging in indoor tanning. In addition participants provided comments indicating that completing the survey had led to decreases in their tanning behaviors.

**Conclusions.** Our study presents novel and compelling support for using brief online surveys for decreasing health-risk behaviors such as sunbed use. Such measures are extremely cost-effective and easy to disseminate and implement. Replication and extension of these findings are warranted.

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## Introduction

Sunbed tanning, largely driven by appearance motivations, is widespread among female college students and is associated with significant health risks (Choi et al., 2010; The International Agency for Research on Cancer Working Group on artificial ultraviolet (UV) light, 2007). Interventions aiming to decrease indoor tanning have mostly focused on health risk awareness and have had limited impact, particularly among young people for whom health consequences may seem distant (Day et al., 2014; Hillhouse and Turrise, 2002). Furthermore, such interventions may not address the important sociocultural aspects of tanning (Robinson et al., 2012). Challenging the tan-ideal and highlighting the role of sociocultural influences might be a promising avenue for prevention (Robinson et al., 2012; Noar et al., 2014), and the little data that exist have supported this approach (Hillhouse et al., 2008).

The present study was conducted following an initial cross-sectional online survey among female undergraduate students who engaged in indoor tanning. Occasional comments from participants following completion of the survey suggested the presence of an inadvertent effect on behaviors. The aim of the present study was therefore to investigate these potential unexpected prevention effects by examining changes in tanning attitudes and behaviors among female college tanners who had completed the initial online survey.

## Methods

A sample of 92 female undergraduate students, mean age = 20.09, SD = 1.41 years who engaged in indoor tanning around the campus of a large northeastern university completed an initial online survey assessing awareness of tanning-related health risks including: the melanoma ABCD; appearance-based motivations to tan and not to tan (Cafri et al., 2006) which included questions assessing sociocultural influences from the media, peers and parents; media literacy related to tanning marketing; and tanning behaviors including frequency and duration. The majority of the sample self-identified as White (90.1%), 4.4% identified as Asian, 3.3% as Hispanic, and 2.2% as another ethnicity. Participants reported spending a mean of 110.35 (SD = 105.11) minutes a

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month engaging in indoor tanning. Four months later, participants were invited to complete a follow-up survey assessing tanning intentions and behaviors since completing the initial survey (see Table 1). In addition, they indicated whether or not they had been considering decreasing their tanning behaviors before the survey. Finally, they were invited to provide any additional comments on how completing the survey might have impacted how often and for how long they went tanning. The initial survey was conducted in January, and the second in April (when it was still too cold to sunbathe outside). The study was approved by the Institutional Review Board and participants received a total of \$15 in compensation for their participation.

## Results

Of the 92 original participants who completed the online survey, 51 (55%) completed the follow-up questions. Of these, 17 (33.3%) had not been considering decreasing their tanning behavior before completing our study survey, and 41 (80.1%) reported reconsidering and questioning their tanning behavior following completing the study survey. Findings regarding the students' tanning frequency since participating in the survey are presented in Table 1. Intent to treat analyses revealed that forty-three students (46.7%) reported having decreased or ceased engaging in indoor tanning. When considering only the completers, 84.3% of participants reported having decreased or ceased engaging in indoor tanning. A chi-square test revealed no relationship between considering decreasing tanning behavior before completing the survey and reporting having decreased behavior since completing the survey,  $\chi^2 = 1.19$ ,  $p = .276$ .

A small group of participants ( $n = 13$ ) provided an additional comment in response to the invitation. Given the low response rate, these comments should be interpreted with caution. Interestingly, they highlighted how the study had emphasized appearance reasons for tanning as the main motivation: "It was just another reminder that tan skin is just tan skin and it doesn't really change who I am. Answering the questions gave me perspective as to why other girls tan and much of it stems from a lack of confidence in their appearance;" "the same factors (appearance, self-esteem) all cause people to go tanning. It makes you think about society and what is truly important." Other comments expressed that completing the survey had lead to decreased tanning but without clarifying what had prompted the change: "completing the survey it was my final push and I don't think I'll go back to it." In addition, participants mentioned their knowledge regarding the health risks: "It pointed out a lot of things that I knew, but chose to ignore." One participant said that the survey had caused her to "reconsider the impact" but not decrease her tanning behavior.

## Discussion

Consistent with previous findings in other fields (McCambridge and Kypri, 2011), our results suggest that completing an online survey might lead to changes in sunbed use in the absence of an intentional intervention. In our study, over 80% of the participants who responded had decreased their tanning behavior since completing the initial online

survey. Furthermore, their qualitative responses directly referenced the survey as contributing to their behavior change, and highlighted how identifying appearance motivations as a driving factor caused them to question the benefits of tanning. The questions related to sociocultural factors may therefore have contributed to this success, as targeting these factors has been successful in changing other appearance-related unhealthy behaviors (Stice et al., 2007).

These findings might be interpreted within the conflict theory of decision-making (Janis and Mann, 1968), based on a gains versus loss model of behavior. This theory posits that individuals engage in health risk behaviors when the risk-benefit balance is perceived to be in favor of the behavior. Consistent with this, "worth-it" cognitions – that is, the perception of the benefits of tanning outweighing the potential risks, have been associated with tanning (Banerjee et al., 2014). Thus, reexamining the benefit–risk balance when information related to the motivations and health consequences of the behavior is salient might lead to changes in perceiving the behavior as "worth-it", and potential behavior change. Completing our initial survey inquiring about the extent and frequency of tanning, while increasing the salience of the associated health risks, and highlighting the appearance motives, may have lead individuals to reappraise the benefits of tanning. This reappraisal may have, in turn, translated into behavioral changes.

Other potential explanations include measurement or observer effects. Furthermore, dual process theories of decision making may provide a framework for understanding these behavioral changes, in that completing the survey might have shifted the decision to tan into the realm of more cognitively challenging mechanisms for conscious decision making (System 2), rather than an automatic reaction (Evans and Stanovich, 2013). Consistent with previous work, health-risk knowledge in itself did not seem to be a mechanism of change (Day et al., 2014).

Should these findings be replicated, prevention interventions delivered in the form of a short online survey would be extremely cost-effective and easy to disseminate and implement. Study limitations include the sample size and education level (Falk and Anderson, 2013) as well as the low follow-up rate (55%). It may be that participants who had not decreased their tanning behavior were less likely to complete the follow-up survey. Furthermore, comparisons of responders and non responders in terms of baseline characteristics would help clarify for whom this type of intervention would be most helpful. As the initial design did not aim to assess behavior change studies with more rigorous designs are required.

In conclusion, our study presents novel and compelling support for using brief online surveys for decreasing sunbed use. Replication and extension of these findings are warranted and future research should consider for whom this type of prevention might be most effective.

## Conflict of interest

The authors declare that there are no conflicts of interests.

## Acknowledgments

This work was funded by an Interdisciplinary research on health policy and law grant from the Northeastern Program on Health Policy & Law.

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**Table 1**

Frequency of changes in tanning behaviors since completion of the initial online survey. Intent to treat and completed analyses.

Have you been tanning since completing our survey?	Intent to treat N (%)	Completers N (%)
Yes, more than before	2 (2.1%)	2 (3.9%)
Yes, as much as before	6 (6.5%)	6 (11.8%)
Yes, but less than before	23 (25%)	23 (45.1%)
Yes, but I have now stopped going	7 (7.6%)	7 (13.7%)
No, not since completing the survey	13 (14.1%)	13 (25.5%)

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